GPS, FINGERPRINT AND QR-CODE BASED ATTENDANCE SYSTEM

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Thesis submitted in fulfillment of the requirements
for the award of the degree of
Bachelor of Computer Science (Computer System & Networking)

Faculty of Computer System & Software Engineering

UNIVERSITI MALAYSIA PAHANG

JANUARY 2019

ACKNOWLEDGEMENTS

I would like to express my deepest appreciation to all those who provided me the possibility to complete this project. A special gratitude I give to my final year project supervisor, Dr. Zafril Rizal Bin M Azmi, whose contribution in stimulating suggestions and encouragement helped me to coordinate my project especially in writing this report. I would like to thank to my client Dr. Zafril Rizal Bin M Azmi for giving me a good user requirement for this system.

Besides, I would like to acknowledge with much appreciation to my parent who gave me mentally and moral support and encouragement during the project on going. Furthermore, I also would like to thank my friends for spending their time in helping and giving me some ideas when I faced problems. Lastly, I also would like to thank everyone who directly or indirectly in helping me in completing this project.

ABSTRAK

Sistem Kehadiran bardasarkan GPS, Fingerprint dan QR-Code adalah satu aplikasi mudah alih yang menggabungkan modul GPS, Fingerprint dan QR-Code untuk mengambil kehadiran pelajar di kelas. Sistem yang dibangunkan adalah untuk menghalang pelajar menipu kehadiran, mengurangkan masa mengambil kehadiran dan mengurangkan beban kerja pensyarah semasa mengira kehadiran pelajar. Objektif projek ini ialah mengkaji sistem yang sedia ada dan membandingkan sistem yang sedia ada dengan sistem yang dicadangkan. Selain itu, projek ini adalah untuk merekabentuk dan membangun sistem yang menggabungkan dengan modul GPS untuk menjejaki kehadiran pelajar semasa pelajar mengambil kehadiran. Objektif terakhir projek ini adalah untuk menguji aplikasi bagi memastikan sistem ini bebas daripada pepijat dan kesilapan. Sistem ini hanya disediakan untuk pengguna Android and hanya untuk mengambil kehadiran pelajar. Sistem ini mempunyai 2 pengguna iaitu pelajar dan pensyarah. Untuk pengguna yang menggunakan sistem ini pertama kali, pengguna perlu mendaftarkan dulu sebelum menggunakannya. Metodologi projek Sistem Kehadiran bardasarkan GPS, Fingerprint dan QR-Code ini menggunakan model pembangunan Agile. Ini adalah kerana model pembangunan Agile boleh membuat apa-apa perubahan keperluan pada bila-bila masa walaupun terlambat dalam pembangunan. Selain itu, ia mengurangkan kekangan masa pembangunan dengan membahagikan tugas besar kepada beberapa tugas kecil. Sistem Kehadiran ini mempunyai beberapa fungsi iaitu pengesahan cap jari di bahagian masuk, pengimbasan QR-code untuk pelajar mengambil kehadiran, navigasi GPS untuk pensyarah mengesan lokasi pelajar apabila pelajar mengambil kehadiran dan menjana laporan kehadiran pelajar. Sistem ini telah diuji dengan menggunakan User Acceptance Test (UAT) oleh pelajar dan pensyarah. Keputusan ujian ini menunjukkan bahawa sistem ini berfungsi dengan baik dan bebas daripada pepijat dan memenuhi kerperluan pengguna.

ABSTRACT

GPS, Fingerprint and QR-Code based Attendance System is a combination of GPS module, Fingerprint and QR-code features mobile application which use to take the students' attendances in class. The system is developed to prevent students cheating on attendances, reduce the time consuming on taking attendances and reduce the workload of the lecturer when calculating the students' attendances. The objective of this project is to study the existing system and compare the existing system with the proposed system. Besides, this project is to design and develop a system combining with GPS module for tracking the students' attendances when check-in. The last objective of this project is to test the application to ensure that there is free of bugs and errors. This system is only available for Android devices and only for taking students' attendance. The system has 2 users which are student and lecturer. For the first time users, they require to register first before using it. The methodology of this project of "GPS, Fingerprint and QR-Code Based Attendance System" is using Agile development model. This is because Agile development model can make any changes of the requirement at any time even late in the development. Besides, it reduces the time constraint of development by dividing a big task to the several small tasks. The "GPS, Fingerprint and QR-Code Based Attendance System" have several functions which Fingerprint verification on the login site, QR-Code scanning for students' check-in, GPS navigation for lecturer to track the student location when students' check-in and generating students' attendance report. This system has been tested by using User Acceptance Test (UAT) by both users which are student and lecturer. The tested result shows that the system is working well and free of bugs and fulfilled the user requirements.

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LIST OF ABBREVIATIONS

GPS	Global Positioning System
WIFI	Wireless Fidelity
QR-Code	Quick Response Code
PDF	Portable Document Format
CSV	Comma-Separated Value
HTML	Hyper Text Markup Language
CSS	Cascading Style Sheets
UI	User Interface
IOS	Internet Explorer
SDK	Software Development Kit
API	Application Programming Interface
JSON	JavaScript Object Notation
SQL	Structured Query Language
SDLC	Software Development Life Cycle
SUT	Software Under Test
UAT	User Acceptance Testing
UUID	Universally Unique Identifier
IE	Internet Explorer

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Smartphone device has been introduced to humanity this few eras and quickly, it became an integral part in our lives. It made our lives more convenient. This is because smartphone device combines different types of functions and features for example, camera device, WIFI network, fingerprint verification, QR code and GPS-based navigation etc. All these functions and features made our live become easier and more convenient. Therefore, there are many institutions have developed their application to manage or communicate with their customers and users.

However, application in mobile devices was rarely used in educational field. In the current scenario, various educational institutions faced a problem in the student's attendance especially for a huge number of students. Majority of the educational institutions in Malaysia still using the manual process to take attendance. The manual process means that when the class or lecture start, lecturer will be passing the attendance list to the students for signing their attendance without any guidance. This will be given opportunities for students to cheat their attendance by asking their friends to sign which causing an inaccurately attendance's report. To prevent students cheating on the attendance, some lecturers will change the different way to take attendance by calling the student's name one by one when the class or lecture begin. This can lead to a waste of time and reduced in academic time. Besides, this process of manually might happen of human error when signing the attendance. Students might sign on the wrong column which is not their name. When the end of the semester, the lecturers must manually key in from the attendance list's paper to the system. This traditional way of taking through the lecturer will increase the workload on lecturer to handle and keep on updating the student's attendance.

In order to reduce all these problems and concern overcome through this problem, a smart mobile application called “GPS, Fingerprint and QR-Code based Attendance System” is generated to resolve the current problems. GPS, Fingerprint and QR-Code based Attendance System has combined several major features which are fingerprint verification, QR-code function, GPS navigation and report generator function. This system has 3 type of users which is lecturer and student. The fingerprint function is used to verify the user’s account whether is lecturer or student. Once lecturers have sign in, they can generate a QR-code for each subject. The purpose of QR-code is used for students check in to the class as their attendance. Before students scan the QR-code, the system forces the users to open internet connection for checking in. The GPS will get student’s current location based on WIFI connectivity or mobile data network. Lecturer have the right to cancel student’s attendance once it is suspicion. The lecturer also can generate a student’s attendance report to keep as a record.

1.2 Problem Statement

The problems of taking student's attendance are stated as below:

Table 1.1: Problem Taking Student's Attendance Manually

Problem	Description	Effect
1. Cheating Attendances	Students will take the opportunity to cheat on attendances by calling their friend to take their signature or take their friend's identical card to check-in.	This may generate an inaccurate attendances report which means the number of students attend in class is different from the attendances list.
2. Time Consuming	To avoid students cheating, some lecturer will take the attendances by calling the student's name when the class begin. This situation will take a long time to complete it.	This may reduce the class teaching time and cause delaying or unfollow according to the teaching plan.
3. Increase workload of lecturer	Before end of the semester, lecturers are requiring to key-in the student's attendance in the system manually. This may increase the works of lecturers if the lecturers have many classes and a lot of students in a semester.	The lecturers may cause error when key-in the student's attendances in the system due to many students and classes.

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